



What is claimed is:

1. A computer implemented method for selecting nucleic acid probes against a target comprising:

inputting quality scores and locations for a plurality ( $n$ ) of candidate probes;

- 5 selecting  $k$  number of probes from the  $n$  number of candidate probes, wherein the selected probes have a maximum aggregate adjusted quality score; wherein the adjusted quality score is based upon the quality score and the overlapping of the selected probes.

- 10 2. The method of Claim 1 wherein the adjusted quality score is calculated according to:  
$$S' = S \sqrt{\frac{l-o}{l}}$$
 wherein  $S'$  is an adjusted quality score;  $S$  is a quality score;  $l$  is the probe length,  $o$  is the overlap the probe has with other probes.

3. The method of Claim 2 wherein the probes are for measuring a transcript.

4. The method of Claim 3 wherein  $k$  is greater than 3.

5. The method of Claim 4 wherein  $k$  is greater than 5.

- 20 6. The method of Claim 5 wherein  $k$  is greater than 10.

7. The method of Claim 6 wherein  $k$  is greater than 15.

8. The method of Claim 2 wherein the selecting step comprises performing dynamic programming optimization.

5 9. The method of Claim 8 wherein the selecting comprises steps of:

calculating best adjusted quality scores ( $Score(i,t)$ ) for probe  $i$  last with  $t-1$  probes chosen before  $i$  and previous location  $j$  providing this best score ( $Last(i,k)$ );

10 determining the best adjusted quality scores for  $Score(j,k)$  to select the last probe; and

selecting the next probe according to  $Last$ (the probe selected, number of probes remain to be selected); and

repeating the selecting step until all  $k$  probes are selected.

15 10. A system for selecting nucleic acid probes comprising:

a processor; and

a memory coupled with the processor, the memory storing a plurality of machine instructions that cause the processor to perform logical steps, wherein the logical steps include:

20 inputting quality scores and locations for a plurality ( $n$ ) of candidate probes;

selecting  $k$  number of probes from the  $n$  number of candidate probes, wherein the selected probes have a maximum aggregate adjusted quality score; wherein the

adjusted quality score is based upon the quality score and the overlapping of the selected probes.

11. The system of Claim 10 wherein the adjusted quality score is calculated according

5 to:  $S' = S \sqrt{\frac{l-o}{l}}$ , wherein  $S'$  is an adjusted quality score;  $S$  is a quality score;

$l$  is the probe length,  $o$  is the overlap the probe has with other probes.

12. The system of Claim 11 wherein the probes are for measuring a transcript.

- 10 13. The system of Claim 12 wherein  $k$  is greater than 3.

14. The system of Claim 13 wherein  $k$  is greater than 5.

15. The system of Claim 14 wherein  $k$  is greater than 10.

16. The system of Claim 15 wherein  $k$  is greater than 15.

17. The system of Claim 16 wherein the selecting step comprises performing dynamic programming optimization.

- 20 18. The system of Claim 17 wherein the selecting comprises steps of:

calculating best adjusted quality scores ( $Score(i, t)$ ) for probe  $i$  last with  $t-1$  probes chosen before  $i$  and previous location  $j$  providing this best score ( $Last(i, k)$ );

determining the best adjusted quality scores for  $Score(j, k)$  to select the last probe; and

selecting the next probe according to  $Last$ (the probe selected, number of probes remain to be selected); and

repeating the selecting step until all  $k$  probes are selected.

19. A computer readable medium having computer executable instructions for performing a method comprising:

inputting quality scores and locations for a plurality ( $n$ ) of candidate probes;

selecting  $k$  number of probes from the  $n$  number of candidate probes,

wherein the selected probes have a maximum aggregate adjusted quality score;

wherein the adjusted quality score is based upon the quality score and the overlapping of the selected probes.

20. The computer readable medium of Claim 19 wherein the adjusted quality score is

calculated according to:  $S' = S \sqrt{\frac{l-o}{l}}$ , wherein  $S'$  is an adjusted quality

score;  $S$  is a quality score;  $l$  is the probe length,  $o$  is the overlap the probe has with other probes.

21. The computer readable medium of Claim 20 wherein the probes are for measuring a transcript.

5 22. The computer readable medium of Claim 21 wherein  $k$  is greater than 3.

23. The computer readable medium of Claim 22 wherein  $k$  is greater than 5.

24. The computer readable medium of Claim 23 wherein  $k$  is greater than 10.

25. The computer readable medium of Claim 24 wherein  $k$  is greater than 15.

26. The computer readable medium of Claim 25 wherein the selecting step comprises performing dynamic programming optimization.

27. The computer readable medium of Claim 26 wherein the selecting comprises steps of:

calculating best adjusted quality scores ( $Score(i, t)$ ) for probe  $i$  last with  $t-1$  probes chosen before  $i$  and previous location  $j$  providing this best score

( $Last(i, k)$ );

determining the best adjusted quality scores for  $Score(j, k)$  to select the last probe; and

selecting the next probe according to *Last*(the probe selected, number of probes remain to be selected); and

repeating the selecting step until all  $k$  probes are selected.

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